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| 09/873,372      | 06/05/2001  | Fredrik Laurell      | 003300-788          | 5761             |

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Benton S. Duffett, Jr.  
BURNS, DOANE, SWECKER & MATHIS, L.L.P.  
P.O. Box 1404  
Alexandria, VA 22313-1404

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| EXAMINER |
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LANDAU, MATTHEW C

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| ART UNIT | PAPER NUMBER |
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2815

DATE MAILED: 04/29/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

7

**Office Action Summary**

Application No.

09/873,372

Applicant(s)

LAURELL ET AL.

Examiner

Matthew Landau

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 14 February 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) 10 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 and 11-17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Election/Restrictions*

This application contains a claim drawn to an invention nonelected with traverse in Paper No. 7. A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-6, 9, and 11-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thony et al. (US Pat. 6,023,479, hereinafter Thony) in view of Wu et al.

In regards to claims 1 and 13, Figure 1 of Thony discloses a microchip laser arrangement, comprising a first chip 2 of active material operative to emit radiation in the near infrared spectral region (column 2, lines 28-32), a second chip 4 of optically bleachable (saturable absorber) material, which can be bleached by optical radiation in the near infrared spectral region, a pump diode laser operative optically to excite said active material (column 6, lines 58-60), and a first and second mirror (6 and 8) enclosing said first chip 2 and second chip 4, in order

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to form a resonant laser cavity. The difference between Thony and the claimed invention is the optically bleachable material comprises a cobalt-doped crystal of spinel type. Wu et al. discloses using  $\text{Co}^{2+}:\text{MgAl}_2\text{O}_3$  materials for saturable absorber Q-switches (see page 1, paragraph 1). In view of such teaching, it would have been obvious to the ordinary artisan at the time the invention was made to modify the invention of Thony by using  $\text{Co}^{2+}:\text{MgAl}_2\text{O}_3$  for the optically bleachable material. The ordinary artisan would have been motivated to modify Thony in the manner described above for the purpose of selecting a material with a large absorption cross section.

In regards to claim 2, Thony discloses the active material comprises erbium-doped glass, operative to emit radiation at essentially 1.54 microns when optically pumped (column 4, lines 34-56).

In regards to claim 3, Thony discloses the length of the chip of active material, in the propagation direction of the laser light, is smaller than about 5mm (column 3, lines 55-60).

In regards to claim 4, Thony discloses the length of the chip of bleachable material, in the propagation direction of the laser light, is smaller than about 5mm (column 2, lines 54-57).

In regards to claim 5, Figure 1 of Thony discloses the laser diode (which emits pump beam 12) is arranged for longitudinal pumping of light into the active material.

In regards to claim 6, Thony discloses the laser diode emits light at 980 nm (column 6, lines 58-60).

In regards to claim 9, Thony discloses at least one lens for focusing the light from the diode (column 6, lines 27-38).

In regards to claim 11, Figure 1 of Thony discloses the chip of active material 2 and the chip of optically bleachable material 4 are bonded together to form a monolithic body.

In regards to claim 12, Figure 1 of Thony discloses mirrors (6 and 8) in the form of dielectric stacks are provided upon the end surfaces of the monolithic body, in order to form a resonant laser cavity enclosing the active material and the optically bleachable material (column 9, lines 1 and 2).

In regards to claim 14, Thony discloses the length of the chip of active material 2, in the propagation direction of the laser light, is less than 1mm (column 3, lines 57-60).

In regards to claim 15, Thony discloses the length of the chip of optically bleachable material, in the propagation direction of the laser light, is smaller than 1mm (column 7, lines 58-62).

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Thony in view of Wu et al. as applied to claim 5 above, and further in view of Molva et al. (US Pat. 5,495,494, hereinafter Molva).

A further difference between Thony and the claimed invention is the chip of optically bleachable material is positioned closer to the diode laser than the chip of active material, in order for light emitted by the diode to pass through the bleachable material before entering the active material. Figure 4a of Molva discloses monolithic microchip laser arrangement with a saturable absorber film (optically bleachable material) between the active material 8 and the entrance mirror 14, which means the absorber layer 22 is closer to the laser diode (column 8,

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lines 45-52). In view of such teaching, it would have been obvious to the ordinary artisan at the time the invention was made to further modify the invention of Thony by including an additional saturable absorber layer between the laser diode and the chip of active material. The ordinary artisan would have been motivated to modify Thony in the manner described above for the purpose of absorbing more energy from the pump beam.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Thony in view of Wu et al. as applied to claim 6 above, and further in view of DiGiovanni et al.

Thony discloses the laser diode emits light at 980 nm (column 6, lines 58-60). A further difference between Thony and the claimed invention is the laser diode is an InGaAs diode. DiGiovanni discloses using an InGaAs laser diode D1 as a pump source (column 3, lines 33-43). In view of such teaching, it would have been obvious to the ordinary artisan at the time the invention was made to further modify the invention of Thony by using an InGaAs laser diode. The ordinary artisan would have been motivated to modify Thony in the manner described above for the purpose of obtaining the desired wavelength light.

Claims 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thony in view of Thony et al. (US Pat. 5,982,802, hereinafter Thony '802).

In regards to claims 16 and 17, the difference between Thony and the claimed invention is the pump diode laser is a continuous-wave laser with an output power less than 1W. Figure 8 of Thony '802 discloses a microlaser pumped with a continuous wave VCSEL (laser diode) with

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an output power of 50mW (column 6, lines 6-10). In view of such teaching, it would have been obvious to the ordinary artisan at the time the invention was made to modify the invention of Thony by using the pump diode of Thony'802. The ordinary artisan would have been motivated to modify Thony in the manner described above for the purpose of generating a beam with reduced divergence (column 2, lines 23-25).

### ***Response to Arguments***

Applicant's arguments filed February 14, 2003 have been fully considered but they are not persuasive.

In response to Applicant's arguments on page 5 that "a person of ordinary skill in the art of microchip lasers would not, in an attempt to improve the microchip laser described by Thony, turn to documents relating to a high power laser", the inventions of Thony and Wu both relate to lasers, therefore they are within the same scope of invention. It is the position of the Examiner that the ordinary artisan would look to certain aspects of a high power laser when modifying a microchip laser, since the general principles of laser operation remain the same for both low and high power. Furthermore, both Thony and Wu disclose it is known to use  $\text{Co}^{2+}$ :YSGG in saturable absorber type Q-switches. Since Wu teaches a saturable absorber can be improved by using a spinel type crystal instead of  $\text{Co}^{2+}$ :YSGG, it is with the skill of an ordinary artisan to improve Thony in the same manner. The spinel type crystal structure could be adapted for use in the microlaser of Thony through routine experimentation. If Applicant contends that successful incorporation of a spinel type crystal in a microchip laser goes beyond the skill level

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of the ordinary artisan, he must disclose how this would be accomplished. The instant application does not disclose any specific dopant concentrations or procedural steps necessary to successfully implement a spinel crystal structure in the saturable absorber of the microchip laser.

In response to Applicant's arguments that "It is not sufficient to reduce the size of the known absorber, due to the bending problem of spinel type crystals", the instant application discloses the bending problem does not occur in crystals with a thickness greater than 0.1mm (page 3, lines 33-35). Thony discloses the thickness of the saturable absorber is 200 microns (0.2mm) (column 7, lines 58-62). Therefore the crystal would not suffer from the bending problems noted by applicant.

In response to applicant's arguments on page 6 that the ordinary artisan must overcome a number of hurdles before combining the teachings of Thony and Wu, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).




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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew C. Landau whose telephone number is (703) 305-4396.

The examiner can normally be reached from 8:00 AM-4:30 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on (703) 308-1690. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.



**EDDIE LEE**  
**SUPERVISORY PATENT EXAMINER**  
**TECHNOLOGY CENTER 2800**

Matthew C. Landau

Examiner

April 25, 2003